

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of the claims in the application:

**Listing of Claims:**

- 
1. (Currently Amended) A coated substrate, comprising:
- an antitarnish layer deposited on a substrate; and
- an outer layer deposited onto said antitarnish layer, said outer layer comprising tin or tin alloys having at least 50% by weight tin, and wherein said antitarnish layer is present in an amount effective to prevent tarnishing of said outer layer and wherein said antitarnish layer has a thickness of less than 1000 Angstroms.
2. (Previously Presented) The coated substrate of claim 1, wherein said antitarnish layer comprises an antitarnish agent selected from the group consisting of zinc, chromium, indium, phosphorous, manganese, boron, thallium, calcium, silver, gold, platinum, palladium, and combinations thereof.
3. [(CANCELLED)]

{4. (CANCELLED)}

5. (Original) The coated substrate of claim 4, wherein said antitarnish layer has a thickness of between 5 and 500 Angstroms.
6. (Original) The coated substrate of claim 1, wherein said outer layer has a thickness of between 10 and 1000 microinches.
7. (Original) The coated substrate of claim 6, wherein said outer layer has a thickness of between 10 to 400 microinches.
8. (Original) The coated substrate of claim 1, further comprising a barrier layer disposed between said substrate and said antitarnish layer.
9. (Previously Presented) The coated substrate of claim 8, wherein said barrier layer comprises an element selected from the group consisting of nickel, tin, iron, cobalt, copper, manganese, and combinations thereof.

10. (Original) The coated substrate of claim 1, wherein said outer layer further comprises a friction-reducing material selected from the group consisting of polyimide, polyamide, polytetrafluoroethylene, silicon carbide, aluminum oxide, tungsten carbide, molybdenum disulfide, and combinations thereof.

*C1  
cancel*  
[11. (Cancelled).]

12. (Original) The coated substrate of claim 1, wherein said substrate comprises copper or a copper alloy.

13. (Previously Presented) A coated substrate comprising a coating on a substrate, said coating having a first surface and a second surface, said second surface positioned adjacent to said substrate, and comprising:

a metal layer comprising tin or tin alloys having at least 50% by weight tin; and

a nonzero concentration gradient of antitarnish agent diffused into said metal layer, said nonzero concentration gradient having the highest concentration of said antitarnish agent at said second surface, said antitarnish agent present in said

coating in an amount effective to prevent tarnishing  
of said metal layer;

and wherein said coating has a thickness between 10  
microinches and 1000 microinches.

14. (Previously Presented) The coated substrate claim 13,  
wherein said antitarnish agent is selected from the group  
consisting of zinc, chromium, indium, phosphorous,  
manganese, boron, thallium, calcium, silver, gold,  
platinum, palladium, and combinations thereof.
15. (Original) The coated substrate claim 13, wherein said  
coating has a thickness of between 10 to 400 microinches.
16. (Original) The coated substrate claim 13, wherein the  
amount of antitarnish agent in said coating ranges from  
0.001 to 5 wt%, based on the total weight of said coating.
17. (Original) The coated substrate claim 16, wherein the  
amount of antitarnish agent in said coating ranges from  
0.005 to 3 wt%, based on the total weight of said coating.

18. (Original) The coated substrate claim 17, wherein the amount of antitarnish agent in said coating ranges from 0.01 to 2 wt%, based on the total weight of said coating.
19. (Original) The coated substrate claim 13, further comprising a barrier layer disposed between said second surface and said substrate.
20. (Previously presented) The coated substrate claim 19, wherein said barrier layer comprises an element selected from the group consisting of nickel, tin, iron, cobalt, copper, manganese, and combinations thereof.
21. (Previously Presented) The coated substrate of claim 13, wherein said coating further comprises a friction-reducing material selected from the group consisting of polyimide, polyamide, polytetrafluoroethylene, silicon carbide, aluminum oxide, tungsten carbide, molybdenum disulfide, and combinations thereof.
22. (Previously Presented) The coated substrate of claim 13, wherein said coating has a coefficient of friction in the range of from 0.1 to 0.3.

- CF*  
23. (Original) The coated substrate claim 13, wherein said substrate comprises copper or copper alloy.
- 

24-41. (Cancelled). ✓

---

42. (New) A coated substrate comprising a coating on a substrate, said coating having a first surface and a second surface, said second surface positioned adjacent to said substrate, and comprising:

a metal layer comprising tin or tin alloys having at least 50% by weight tin; and

*2*  
a nonzero concentration gradient of antitarnish agent diffused into said metal layer, said nonzero concentration gradient having the highest concentration of said antitarnish agent at said second surface, said antitarnish agent present in said coating in an amount effective to prevent tarnishing of said metal layer;

and wherein said coating has a thickness between 10 microinches and 1000 microinches; and  
a barrier layer disposed between said second surface and said substrate, said barrier layer comprising an element selected from the group consisting of nickel, tin, iron, cobalt, copper, manganese, and combinations thereof.

43. (New) The coated substrate claim 42, wherein said antitarnish agent is selected from the group consisting of zinc, chromium, indium, phosphorous, manganese, boron, thallium, calcium, silver, gold, platinum, palladium, and combinations thereof.
44. (New) The coated substrate claim 42, wherein said coating has a thickness of between 10 to 400 microinches.
45. (New) The coated substrate claim 42, wherein the amount of antitarnish agent in said coating ranges from 0.001 to 5 wt%, based on the total weight of said coating.
46. (New) The coated substrate claim 45, wherein the amount of antitarnish agent in said coating ranges from 0.005 to 3 wt%, based on the total weight of said coating.
47. (New) The coated substrate claim 46, wherein the amount of antitarnish agent in said coating ranges from 0.01 to 2 wt%, based on the total weight of said coating.
48. (New) The coated substrate of claim 42, wherein said coating further comprises a friction-reducing material



selected from the group consisting of polyimide, polyamide, polytetrafluoroethylene, silicon carbide, aluminum oxide, tungsten carbide, molybdenum disulfide, and combinations thereof.

49. (New) The coated substrate of claim 42, wherein said coating has a coefficient of friction in the range of from 0.1 to 0.3.
50. (New) The coated substrate claim 42, wherein said substrate comprises copper or copper alloy.
-